

I claim:

1. A method of adapting audio according to a listener's auditory capability,

comprising the steps of:

accessing a personal audio profile of the listener, the audio profile

describing the auditory capability of the listener in relation to a plurality of

audible frequencies;

accessing a digital representation of audible sound; and

creating an adapted representation of audible sound by modifying the

digital representation based on the audio profile to assist the listener in

perceiving the audible sound.

2. The method of claim 1, wherein the step of creating an adapted representation

comprises the steps of:

converting the representation to a different data format than that in which

it was accessed, creating a converted representation;

transforming the converted representation to a frequency domain vector

using a Fourier transform;

scaling the frequency domain vector according to the audio profile,

creating an adapted frequency domain vector;

transforming the adapted frequency domain vector to an adapted time

domain sample using an inverse Fourier transform; and

converting the adapted time domain sample to a format for presentation.

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1 3. The method of claim 2, wherein the scaling step further comprises one or  
2 more of the steps of frequency filtering, frequency shifting, frequency masking  
3 compensation, and adaptive signal processing.

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1 4. The method of claim 1, further comprising the step of:  
2 initiating a transmission of the adapted representation to the listener.

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1 5. The method of claim 4 wherein the representation is accessed and the adapted  
2 representation is transmitted through a network of computers.

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1 6. The method of claim 1 wherein the audio profile is stored in a database.

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1 7. The method of claim 6 wherein the audio profile is provided to the database  
2 by an audio test agent through a network of computers.

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1 8. The method of claim 1 wherein the adapted representation includes audio  
2 information representing a range of frequencies from 20 Hz to 20 kHz.

1 9. A system for assisting a hearing deficient user, comprising:

2 a database for storage of an audio profile of the user, the audio profile  
3 describing the auditory capability of the user in relation to a plurality of audible  
4 frequencies;

5 an adaptation engine coupled to the database for receiving an audio  
6 representation selected by the user and modifying the audio representation  
7 according to the audio profile wherein the modifying assists the user in hearing  
8 the audio representation.

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1 10. The system of claim 9 wherein the audio representation is received over a  
2 packet-switched network of computers.

1 11. The system of claim 9 wherein the adaptation engine further comprises:

2 a converter configured to convert the audio representation from its  
3 original format into a base format, creating a converted audio representation;

4 a transformation module coupled to the converter configured to transform  
5 the converted audio representation into a frequency representation;

6 a scaling module coupled to the transformation module configured to  
7 scale the frequency representation based on the audio profile, creating a scaled  
8 representation.

1 12. The system of claim 11 wherein the scaled representation includes audio  
2 information representing a range of frequencies from 20 Hz to 20 kHz.

1 13. The system of claim 11 wherein the scaling module is further configured to  
2 scale the frequency representation by one or more of frequency filtering,  
3 frequency shifting, frequency masking compensation, and adaptive signal  
4 processing.

1 14. The system of claim 11 wherein the transformation module is further  
2 configured to transform the scaled representation into the base format creating a  
3 scaled converted audio representation and the converter is configured to convert  
4 the scaled converted audio representation into a presentation format creating a  
5 scaled audio representation for transmission to the user.

1 15. The system of claim 14 wherein the scaled audio representation is  
2 transmitted over a packet-switched network of computers.

1 16. The system of claim 14 wherein the scaled audio representation can be  
2 presented by a computer for listening by the user.

1 17. The system of claim 9 wherein the adaptation engine is located on a user  
2 computer.

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1 18. The system of claim 9 wherein the adaptation engine is located on a  
2 computer coupled to a network, the computer being remote from the user.

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1 19. The system of claim 9 wherein the audio profile is generated by and  
2 provided to the database by an audio testing agent through a computer network.

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1 20. A network audio adaptation server comprising:

2 a memory configured to store a personal audio profile of a listener, the  
3 audio profile describing the auditory capability of the user in relation to a  
4 plurality of audible frequencies;

5 a proxy configured to access an audio representation selected by the  
6 listener, the audio representation being in a digital format;

7 a transformation module coupled to the memory and the proxy,  
8 configured to transform the audio representation into a frequency  
9 representation;

10 a scaling module coupled to the transformation module, configured to  
11 scale the frequency representation based on the audio profile creating a scaled  
12 representation, whereby the transformation module is further configured to  
13 transform the scaled representation into the digital format;

14 a transmitter for initiating delivery of the digital format scaled  
15 representation to a listener computing device via the network.

1 21. The server of claim 20, wherein the transformation module and the scaling  
2 module operate upon the representations in a batch process, whereby the scaled  
3 representation is of higher quality than is producible in a real-time process.

1 22. A machine-readable medium having embodied thereon a program, the  
2 program being executable by a machine to perform method steps for providing  
3 audio adapted according to a listener's auditory capability, the method steps  
4 comprising:  
5       accessing a personal audio profile of the listener, the audio profile  
6 describing the auditory capability of the listener in relation to a plurality of  
7 audible frequencies;  
8       accessing a digital representation of audible sound selected by the listener;  
9 and  
10       creating an adapted representation of audible sound by modifying the  
11 digital representation based on the audio profile to assist the listener in  
12 perceiving the audible sound.